

National Aeronautics and Space Administration



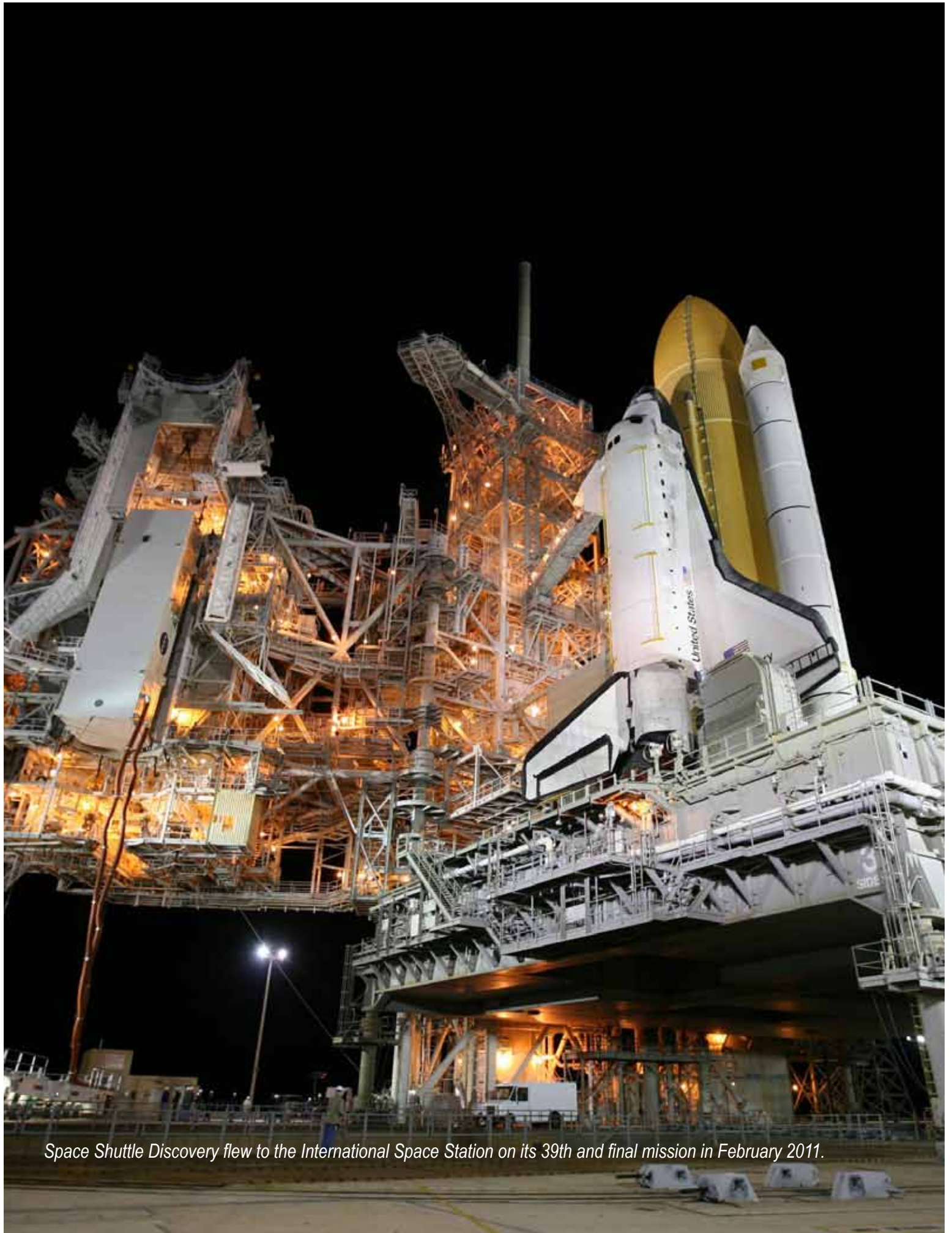
2011

NASA Glenn Overview of the Strategic Action Plan



dream big





Space Shuttle Discovery flew to the International Space Station on its 39th and final mission in February 2011.

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International Space Station viewed from Space Shuttle Atlantis as the shuttle approached the station during rendezvous and docking operations on May 16, 2010.

Director's Intent



NASA's mission is to drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of the Earth. In support of the Agency's mission, we at the Glenn Research Center drive research, technology, and systems to advance aviation, enable exploration of the universe, and improve life on Earth.

Since I arrived at Glenn in 2007, I have consistently heard concerns that the Center is not doing enough to ensure its future viability. I have heard this sentiment from

every level at Glenn: employees, supervisors, and managers. I want to assure you that the Glenn senior management team is mindful of the Center's future and is actively engaged in a very robust approach to securing new work. I could write for hours about the ongoing hands-on activities at Glenn. In fact, some of you have been active participants in these activities and may not even be aware of it. Our approach includes internal advocacy for aeronautics and space research and development assignments, as well as external efforts with other Government agencies and commercial entities.

Although meeting current commitments to our customers and stakeholders is our highest priority, I—and I expect you—will strive to help the Center achieve the following five strategic goals:

1. Provide world-class research and technology, revolutionizing aeronautics and space exploration.
2. Advance space missions and aeronautics by leveraging our core competencies to deliver concept-through-flight systems.
3. Deliver program and project management excellence that results in successful missions for our customers and challenging, long-term assignments for continued achievements.
4. Provide excellent institutional capability to enable NASA mission success.
5. Be an integral part of the Ohio community and the Nation.

These ambitious strategic goals cannot be accomplished without dedicated commitment and followthrough. Without actions, they are just words.

Therefore I ask each and every employee to not only read this plan—and where appropriate inform me and your senior management where it can be improved—but also to work to it and truly make our Center a “supplier of choice” within and outside the Agency.



Agency's Strategic Direction and Mission

The Agency has established our strategic direction with the NASA vision, mission, and goals.

The Agency Vision

To reach for new heights and reveal the unknown, so that what we do and learn will benefit all humankind.

The Agency Mission

Drive advances in science, technology, and exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of the Earth.

The Agency is guided by six goals:

- Goal 1: Extend and sustain human activities across the solar system.
- Goal 2: Expand scientific understanding of the Earth and the universe in which we live.
- Goal 3: Create the innovative new space technologies for our exploration, science, and economic future.
- Goal 4: Advance aeronautics research for societal benefit.
- Goal 5: Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.
- Goal 6: Share NASA with the public, educators, and students to provide opportunities to participate in our mission, foster innovation, and contribute to a strong national economy.

Glenn is vital to NASA achieving these goals. Glenn will continue to make significant contributions to NASA's future.

Glenn's Strategic Direction and Mission

We have defined our strategic direction using our mission, goals, core competencies, and mission-enabling capabilities.

Glenn's Mission

We drive research, technology, and systems to advance aviation, enable exploration of the universe, and improve life on Earth.

Glenn's Goals and Objectives

We have identified five Glenn goals that are directly aligned with and support the implementation of NASA's goals.

Glenn Goals and Relationship to Agency Goals



NASA Goal 1

Extend and sustain human activities across the solar system.



NASA Goal 2

Expand scientific understanding of the Earth and the universe in which we live.



NASA Goal 3

Create the innovative new space technologies for our exploration, science, and economic future.



NASA Goal 4

Advance aeronautics research for societal benefit.



NASA Goal 5

Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.



NASA Goal 6

Share NASA with the public, educators, and students to provide opportunities to participate in our mission, foster innovation, and contribute to a strong national economy.

Glenn's goals are directly aligned with and support NASA's goals.

Glenn Goal 1

Provide world-class research and technology, revolutionizing aeronautics and space exploration.



Glenn Goal 2

Advance space missions and aeronautics by leveraging our core competencies to deliver concept-through-flight systems.



Glenn Goal 3

Deliver program and project management excellence that results in successful missions for our customers and challenging, long-term assignments for continued achievements.



Glenn Goal 4

Provide excellent institutional capability to enable NASA mission success.



Glenn Goal 5

Be an integral part of the Ohio community and the Nation.



Glenn's Goals and Objectives—Goals 1 and 2

Goal 1: Provide world-class research and technology, revolutionizing aeronautics and space exploration.

Objective 1.1: (Aero) Enable faster, safer, more efficient, and more environmentally friendly aircraft and enable more efficient airspace operations.

Objective 1.2: (Space) Expand human and robotic exploration capabilities for safer, faster, more reliable, more flexible, and more efficient space travel that provides more scientific returns and discovery, destinations of choice, and value-based transition to commercialization.

Objective 1.3: (Others) Infuse aerospace technologies into emerging commercial product development.

Goal 2: Advance space missions and aeronautics by leveraging our core competencies to deliver concept-through-flight systems.

Objective 2.1: Make operational aeronautic flight systems safer, more efficient, and more capable by taking new technology to flight through advanced development efforts (TRLs¹ 4 to 6).

Objective 2.2: Increase the capability, reliability, and safety of space flight systems through advanced development efforts (TRLs 4 to 6).

Objective 2.3: Enable mission success by developing mission systems (deliver a system—TRL 6 or mature technology to flight).

Objective 2.4: Reduce system cost and risk by utilizing unique test facilities; provide affordable world-class and unique capabilities for testing.

¹ TRL, technology readiness level.

Glenn's Goals and Objectives—Goals 3 to 5

Goal 3: Deliver program and project management excellence that results in successful missions for our customers and challenging, long-term assignments for continued achievements.

Objective 3.1: Deliver on projects within negotiated cost, schedule, and technical parameters.

Objective 3.2: Expand Glenn's business base to all NASA mission directorates; be invited to lead or participate in new missions.

Goal 4: Provide excellent institutional capability to enable NASA mission success.

Objective 4.1: Foster a highly skilled, diverse, and engaged workforce to achieve mission success.

Objective 4.2: Optimize and maintain institutional capabilities and readiness for mission success (workforce, facilities, labs, information technology, and services).

Objective 4.3: Provide effective and efficient business services and infrastructure operations.

Goal 5: Be an integral part of the Ohio community and the Nation.

Objective 5.1: Leverage Center resources by establishing key partnerships.

Objective 5.2: Enhance our communities' understanding of NASA and Glenn.

Summary

At Glenn, we will work as a team to do research and develop new technology (Goal 1); we will take new technology to flight and provide innovative engineering concepts and designs for flight systems (Goal 2); we will deliver on our commitments and by doing so will capture new and exciting work assignments (Goal 3); we will be good stewards of our resources and continue to become more effective and efficient in how we deliver our mission (Goal 4); and we do so for the benefit of our community and our Nation (Goal 5).

Glenn's Core Competencies

The Center has many technical and institutional competencies. The six core competencies approved by the Center and described in this section are critical to the health and future of the Center. Glenn's core competencies and mission-enabling capabilities are integral parts of the Agency capability portfolio that supports NASA's strategic plan and missions.

Air-Breathing Propulsion



This competency includes revolutionary concepts, technologies, and new systems aimed at significantly advancing air-breathing propulsion for aerospace vehicles that enable reduced energy consumption, use of alternative energy sources, reduced noise and emissions, increased versatility, improved safety of operations, faster modes of air transportation, and reduced costs for aerospace travel. Research and development areas critical to success

include systems assessments; innovative engine cycles and advanced propulsion systems; component improvements; controls and dynamics; harsh environment sensors, electronics, instrumentation, health monitoring and management, materials, and structures; power extraction and management; icing; fuels and propellants; acoustics, fluid mechanics, and heat transfer; aerothermodynamics and plasmas, multidisciplinary design, optimization, modeling, and simulation; and testing and evaluation in a broad range of aeronautical conditions.

Communications Technology and Development

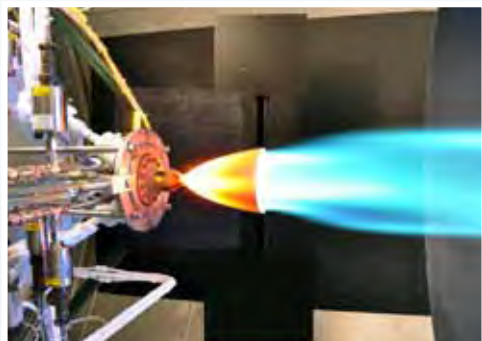


This competency includes research, development, demonstration, and infusion for advanced communications to enable order-of-magnitude increases in mission data transfer and continuous, cost-effective, and secure high-data-rate communications. It involves knowledge and practices associated with researching and developing air and space communications architectures, components, subsystems, systems, and networks to meet mission and system requirements. It also involves researching and developing technology for improving air traffic management, communications and navigation among satellites, flight craft, spacecraft, astronauts, robots, and ground

systems. Of particular focus are the development of advanced antennas, integrated radiofrequency and optical terminals, software-defined radios, high-power amplifiers, and networking for high-data-rate communications; and expertise in space flight communications, systems analysis and engineering, and test and evaluation to enable technology infusion.

Glenn's Core Competencies

In-Space Propulsion and Cryogenic Fluids Management



This competency includes the research, technology development, technology demonstration, and flight development of components, subsystems, and systems for spacecraft propulsion systems, propulsion stages, and cryogenic fluid flight systems to enable new mission capability; increased reliability, safety, and affordability; and reduced trip times. This involves

the design, testing, and evaluation of in-space propulsion technologies and systems such as propellants, chemical propulsion, electric propulsion (ion, Hall, and plasma), nuclear propulsion, and other advanced concepts; reaction control; and orbital maneuvering. It also involves the knowledge, capabilities, and practices associated with cryogenic fluid management, including cryogenic fluids handling, characterization, storage, delivery, demonstration, and flight packages. Research and development areas critical to success include the development of advanced technologies; integrated systems analysis; multidiscipline optimization; the development of predictive tools; and the thermal, fluids, combustion, structures, controls, dynamics, systems safety, test, and evaluation disciplines for a broad range of in-space conditions.

Power, Energy Storage and Conversion



This competency includes the research, development, demonstration, and application of new technologies, subsystems, and systems for power generation; energy conversion and storage; and power management and distribution from concept to flight. It involves research, development, and the application of knowledge and capabilities to the design, development, test, and evaluation of concepts, materials, devices, environmental impact, components, subsystems, and systems for all aerospace vehicles. It also includes the application of knowledge and expertise to related terrestrial applications. Of particular focus are solar power generation, batteries, fuel cells, regenera-

tive fuel cells, flywheels, thermal energy conversion and heat rejection, radioisotopes, fission, power electronics, and power management and distribution components.

Glenn's Core Competencies

Materials and Structures for Extreme Environments



This competency includes the research, development, demonstration, and application of advanced materials, structures, and mechanisms to enable high-performance, long-life aerospace systems subjected to the extreme environments encountered in aircraft engines, space propulsion systems, planetary reentry, planetary surface operations, and long-duration space travel. Examples of extreme environments include the combination of high temperature and pressure, load, and complex gaseous atmospheres ranging from oxidizing to reducing; cryogenic temperatures; electrical and electromagnetic environments,

including exposure to plasma; and space radiation. Research and development areas critical to success include the development of advanced materials based on indepth understanding of microstructure-property-performance relationships, new structural and robust mechanism concepts, development of physics-based and engineering computational tools and predictive capabilities, and testing and evaluation in a very broad range of extreme conditions.

Physical Sciences and Biomedical Technologies in Space



This competency includes the research, development, demonstration, and flight of advanced physical and biomedical systems to enable sustainable exploration of space with enhanced safety, extended mission duration, and reduced deleterious effects of space. Space flight and ground-based research are conducted to study the effects of the space environment to elucidate fundamental mechanisms, develop

predictive frameworks and advanced technologies, and develop and implement countermeasures to mitigate any adverse effects. The research provides critical knowledge needed to design a wide range of reliable and efficient life support, fire safety, crew health monitoring and support, space resource utilization, thermal management, and other critical systems for NASA and commercial spacefaring customers. The space environment includes microgravity, reduced gravity, ionizing and non-ionizing radiation, alternative crew atmospheres, and combinations of these and other variables.

Core Values



SAFETY

Glenn's constant attention to safety is the cornerstone upon which we build mission success. We are committed, individually and as a team, to protecting the safety and health of the public, our team members, and those assets that the Nation entrusts to the Agency.



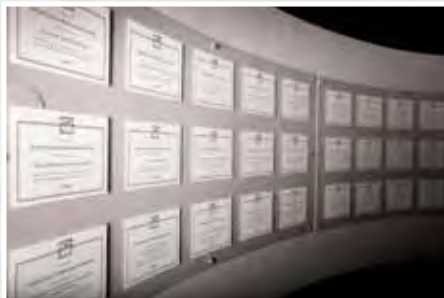
INTEGRITY

Glenn is committed to maintaining an environment of trust, built upon honesty, ethical behavior, respect, and candor. Our leaders enable this environment by encouraging and rewarding a vigorous, open flow of communication on all issues, in all directions, among all employees without fear of reprisal. Building trust through ethical conduct as individuals and as an organization is a necessary component of mission success.



TEAMWORK

NASA's most powerful tool for achieving mission success is a multidisciplinary team of diverse, competent people across all NASA centers. Glenn's approach to teamwork is based on a philosophy that each team member brings unique experience and important expertise to project issues. Recognition of and openness to that insight improves the likelihood of identifying and resolving challenges to safety and mission success. We are committed to creating an environment that fosters teamwork and processes that support equal opportunity, collaboration, continuous learning, and openness to innovation and new ideas.



EXCELLENCE

To achieve the highest standards in engineering, research, operations, and management in support of mission success, Glenn is committed to nurturing an organizational culture in which individuals make full use of their time, talent, and opportunities to pursue excellence in both the ordinary and the extraordinary.

Closing Remarks



The success of the Agency and the future vitality of the Center depend on our achievement of these goals and objectives.

To ensure accountability, I have assigned each objective in this plan to a senior Glenn manager and included it in his or her individual performance plan. In addition, detailed deliver-the-mission and improvement strategies are being developed and fine tuned, along with metrics and measures to assess our effectiveness and efficiency in accomplishing these strategies.

The Center's leadership is committed to this Strategic Action Plan and will monitor the status of the goals, objectives, strategies, and actions on a regular basis at the Director's Senior Management (DSM) meetings.

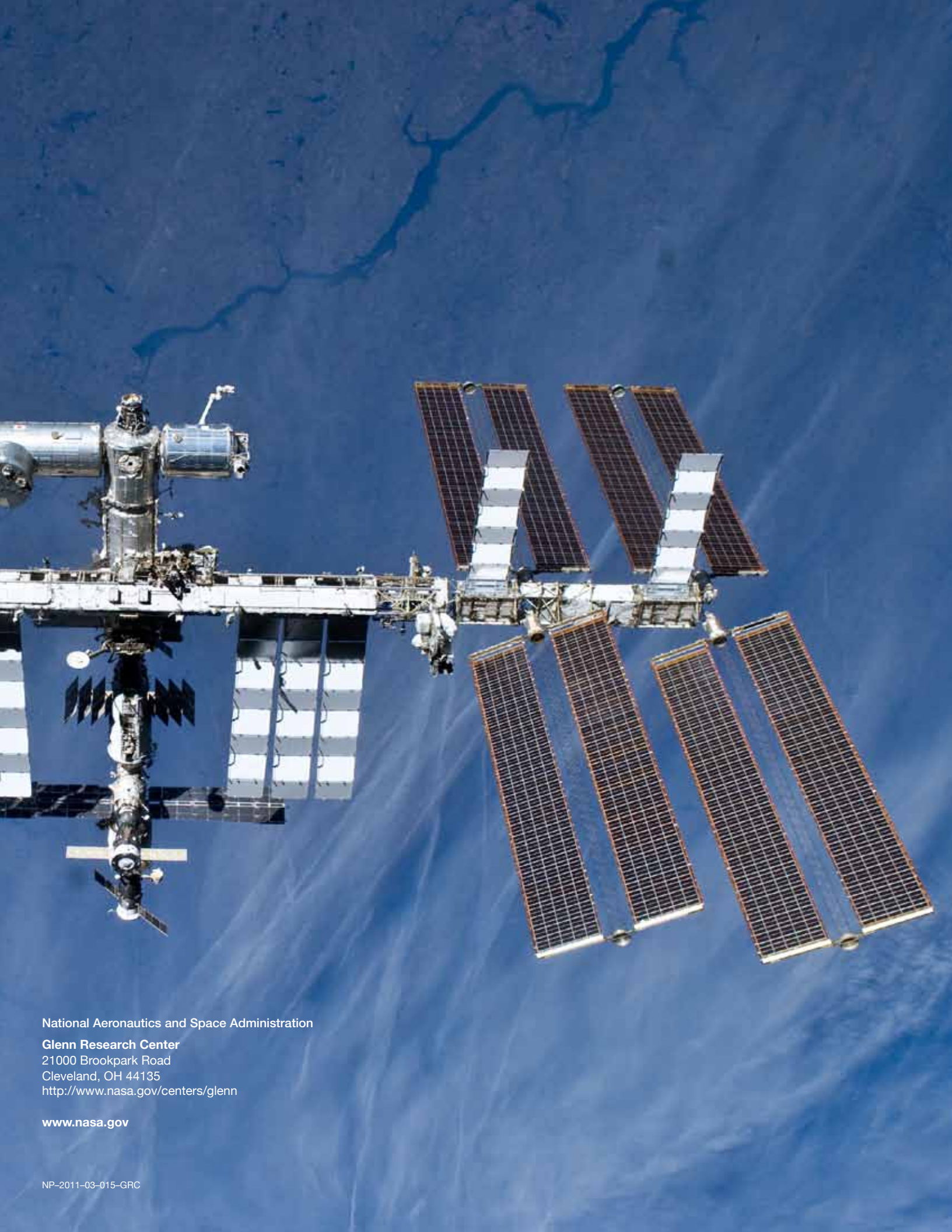
We will provide performance information on the status of the objectives, strategies, and actions to Center staff at least annually and to NASA Headquarters and other stakeholders as requested.

Center leadership will formally review this plan annually and will update it as needed. We will continue, as we did while developing this plan, to involve a broad representation of Center staff in each review and update. We will communicate all plan updates externally as well as internally.

In closing, we note that the Center currently has a larger, more diversified, and more forward-looking portfolio than it has had in several years. It represents a future that is both challenging and clear. Each of us must now fully commit to meeting our responsibilities defined in the portfolio assigned to Glenn by the Agency and the Nation.



International Space Station viewed from Space Shuttle Discovery on April 5, 2010, as Discovery delivered the Leonardo Multi-Purpose Logistics Module during the STS-131 mission. The module was filled with racks for the station's laboratories.



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